

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
2 June 2005 (02.06.2005)

PCT

(10) International Publication Number
WO 2005/050404 A2

(51) International Patent Classification⁷:

G06F

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:

PCT/US2004/038853

(22) International Filing Date:

17 November 2004 (17.11.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/520,254 17 November 2003 (17.11.2003) US

(71) Applicant (*for all designated States except US*): **VIRGINIA TECH INTELLECTUAL PROPERTIES, INC.** [US/US]; 1872 Pratt Drive, Suite 1625, Blacksburg, VA 24060 (US).

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

(75) Inventors/Applicants (*for US only*): **VARADARA-JAN, Srinidhi** [IN/US]; 530 Coal Bank Hollow Road, Blacksburg, V 24060 (US). **RUSCIO, Joseph, Francesco** [US/US]; 301 North Knollwood Drive, Suite 7304, Blacksburg, VA 24060 (US).

Published:

— *without international search report and to be republished upon receipt of that report*

(74) Agents: **NEEL, Bruce, T.** et al.; 2450 Colorado Avenue, Suite 400E, Santa Monica, CA 90404 (US).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 2005/050404 A2

(54) Title: TRANSPARENT CHECKPOINTING AND PROCESS MIGRATION IN A DISTRIBUTED SYSTEM

(57) Abstract: A distributed system for creating a checkpoint for a plurality of processes running on the distributed system. The distributed system includes a plurality of compute nodes with an operating system executing on each compute node. A checkpoint library resides at the user level on each of the compute nodes, and the checkpoint library is transparent to the operating system residing on the same compute node and to the other compute nodes. Each checkpoint library uses a windowed messaging logging protocol for checkpointing of the distributed system. Processes participating in a distributed computation on the distributed system may be migrated from one compute node to another compute node in the distributed system by re-mapping of hardware addresses using the checkpoint library.